REMARKS

[0010] Applicant respectfully requests reconsideration and allowance of all of the claims of the application. The status of the claims is as follows:

- Claims 23, 25-29 and 63-74 are currently pending
- Claims 1-22, 24 and 30-62 are canceled herein
- No Claims are withdrawn herein
- Claims 23 and 29 are amended herein
- New claims 63-74 are added herein

[0011] Support for the amendments to claim 23 is found in the specification at least at page 27.

[0012] Furthermore, new claims 63-74 are fully supported by the Application, and therefore do not constitute new matter. Support for these new claims is found in the specification at least at Figure 13 and in claims 23 and 25-29. New claims Claims 63-74 are allowable over the cited documents of record for at least the same reasons claims 23 and 25-29 are allowable.

Cited Documents

[0013] The following documents have been applied to reject one or more claims of the Application:

- ***Mancuso***: ***Mancuso, et al.***, U.S. Patent No. ***6,600,839***
- ***Ishikawa***: ***Ishikawa***, U.S. Patent No. ***6,330,075***

Claims 23 and 25-29 Are Non-Obvious Over Mancuso in view of Ishikawa

[0014] Claims *23 and 25-29* stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Mancuso in view of Ishikawa. Applicant respectfully traverses the rejection.

Amended Independent Claim **23**

[0015] Applicant submits that the Office has not made a *prima facie* showing that independent claim 23 is obvious in view of the combination of Mancuso and Ishikawa. Applicant submits that the combination of Mancuso and Ishikawa does not teach or suggest at least the following features of this claim (in part, with emphasis added):

- "a diffusion engine for applying a reversible diffusion function for reducing the magnitude of at least some of the pixel values and for reducing variability in the difference between adjacent pixel values in a subject matrix by diffusing magnitudes of pixel values into each other to thereby reduce noise associated with application of a frequency domain transform and application of an inverse frequency domain transform, *wherein an anchor value facilitates reverse diffusion by the reversible diffusion function*"
- "an anchor value selector associated with the diffusion engine to select one of the pixel values in a given matrix as the anchor value wherein *the anchor value facilitates the reverse diffusion by the reversible diffusion function to restore the magnitude of the at least some of the pixel values* after application of the frequency domain transform to the diffused pixel values and application of the inverse frequency domain transform to recover the diffused pixel values"

[0016] For example, the combination of Mancuso and Ishikawa does not teach or suggest "a diffusion engine for applying a reversible diffusion function ... *wherein an anchor value facilitates reverse diffusion by the reversible diffusion function*" as recited in this claim, as amended. Note that the Examiner has not previously considered the newly amended feature where "*an anchor value facilitates reverse diffusion*".

[0017] However, regarding the claimed anchor value, the Examiner cites Mancuso (Action, p. 3), item 114 in Fig. 6, shown here for convenience:

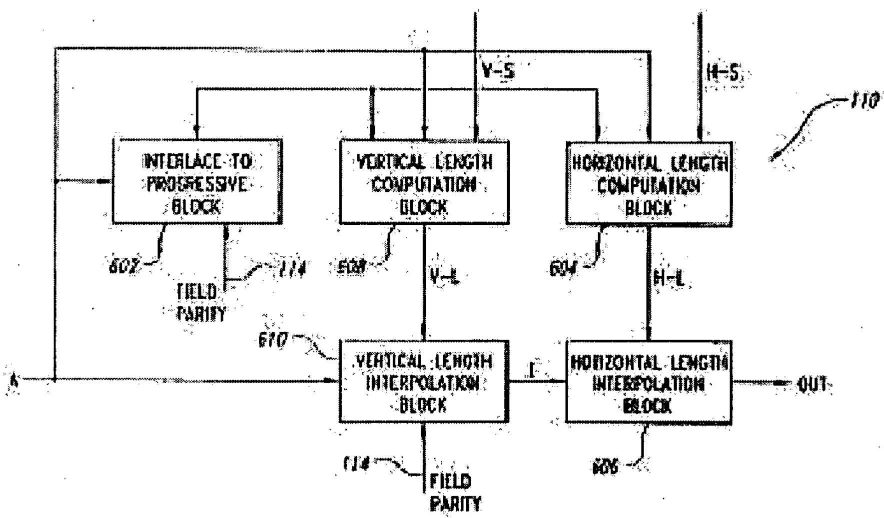


Fig. 6

[0018] As shown above, item 114 (Field Parity) is shown twice in this figure as supplying input to Interlace to Progressive Block (602) and Vertical Length Interpolation Block (610). Regarding item 114 (Field Parity), Mancuso teaches and suggests the following (in pertinent part, with emphasis added):

> **The interlace to progressive block 602 converts an interlaced signal to a non-interlaced signal** ...
>
> The interlace to progressive block 602 expands the 4*8 pixel sub-block into a 7*8 pixel sub-block, for example, by interpolating the missing odd or even pixels. Because the image is scanned into the filter 100 one row at a time, the filter 100

receives an odd row, then an even row, then an odd row, then an even row, etc., or vice versa ...

The parity signal 114 is input to the interlace to progressive block 602 to change the pixel selection according to whether the interlace to progressive block 602 converts missing lines with odd parity or missing lines with even parity. Implementation of the field parity signal 114 in the interlace to progressive block 602 is well known.

The conversion may be termed "interlace-to-progressive conversion." Of course, a particular type of interlace-to-progressive conversion is not required by the present invention. Thus, interlace to progressive block 602 can perform scan line duplication, scan line interpolation, and field processing. For example, one embodiment of the interlace to progressive block 602 includes a nine-point median filter (not shown) **that smoothes the image** by replacing each target pixel value with the median gray scale value of its eight immediate neighboring pixels. Of course, those skilled in the art will appreciate that the nine-point median filter is not required by the present invention. The output of the interlace to progressive block 602 is input to the horizontal length computational block 604 (Mancuso, Col. 6, lines 5-53).

The output of the vertical length computational block 608 is input to a vertical interpolation block 610, **which generates interpolated gray level values associated with neighboring pixels in the vertical processing window 502 using the field parity signal 114**.(Mancuso, Col. 10, lines 13-17).

[0019] As shown above, when used with the Interlace to Progressive Block 602, field parity signal 114 facilitates conversion of an interlaced signal into a non-interlaced signal by specifying odd or even parity. When used with the Vertical Length Interpolation Block 610, the field parity signal 114 facilitates interpolation, which Applicant asserts implies the adding of neighboring pixels based on, for example, mathematical interpolation. Applicant also asserts that this adding of pixels by interpolation is substantively analogous to interlacing. In either of these cases, the use of the field parity signal 114, as suggested by Mancuso, is in no way analogous to the claimed “anchor value [that] facilitates reverse diffusion” as recited in this claim, as amended, because any of interlacing, deinterlacing or interpolation is not analogous to “reverse diffusion” as recited in this claim, as amended. Additionally, as shown above, Mancuso also

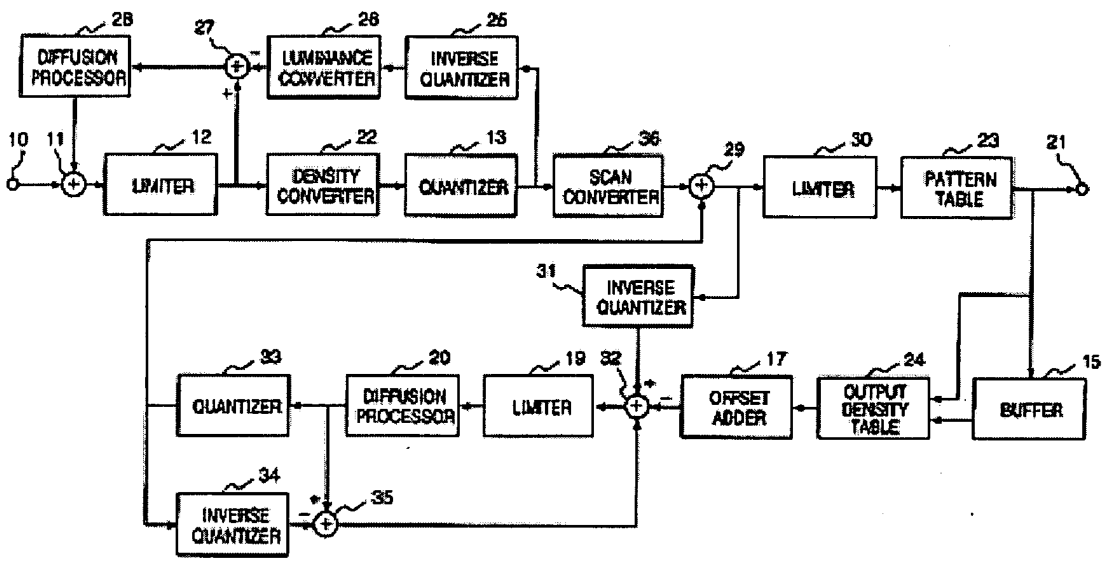
suggests, for example, that one embodiment of the Interlace to Progressive Block 602 includes a nine-point median filter (not shown) that **smoothes the image** (emphasis added). In this case, Applicant asserts that the Interlace to Progressive Block 602 performs something that greatly differs from "reverse diffusion" since Mancuso suggests smoothing of the image. Thus, Applicant asserts that the field parity signal 114 facilitates something that greatly differs from "reverse diffusion". Therefore, Mancuso does not teach or suggest that any "*anchor value facilitates reverse diffusion*" as recited in this claim, as amended.

[0020] Additionally, this claim, as amended, recites that "one of the pixel values in a given matrix [is selected] as the anchor value". This is further evidence that the field parity signal 114 is not analogous to the claimed "anchor value" because Mancuso appears to suggest that the field parity signal 114 is essentially a binary value associated with odd or even parity, and not a pixel value. Mancuso does not teach or suggest that the field parity signal 114 is "one of the pixel values in a given matrix" as recited in this claim. Thus, as further evidence, Mancuso does not teach or suggest that "an anchor value facilitates reverse diffusion" as recited in this claim, as amended.

[0021] As another example, the combination of Mancuso and Ishikawa does not teach or suggest "wherein *the anchor value facilitates the reverse diffusion by the reversible diffusion function to restore the magnitude of the at least some of the pixel values*" as recited in this claim, as amended. Note that the Examiner has not previously considered the newly amended feature that the anchor value "*facilitates the reverse diffusion*".

[0022] Applicant agrees with the Examiner that Mancuso does not particularly teach a "*reversible diffusion function to restore the magnitude of the at least some of the pixel values*" (Action, p. 4), and thus the Examiner relies on Ishikawa for this feature, citing items 28, 36, 20 and 33 of Fig. 4, shown here for convenience:

FIG. 4



[0023] However, Ishikawa does not make up for the deficiency of Mancuso because Ishikawa does not teach or suggest that "**the anchor value facilitates the reverse diffusion** ... to restore the magnitude of the at least some of the pixel values" as recited in this claim, as amended, because Ishikawa does not teach that any anchor value "**facilitates the reverse diffusion**".

[0024] Regarding item 28 (diffusion processor), Ishikawa teaches and suggests (Col. 7, line - Col.8, line 7) (in pertinent part, with emphasis added):

> The luminance signals of RGB entered from the input terminal 10 are applied to the adder 11, which sums these with an error signal from the diffusion processor 28 per each luminance signal of R, G, B, the error signal being the result of

> density conversion and quantization ... The subtractor 27 subtracts the restored RGB luminance signals from the RGB outputs of the limiter 12, whereby the error due to density conversion and quantization is calculated. **The calculated error is diffused to the neighboring pixels by the diffusion processor 28** and the accumulated error is outputted to the adder 11.

[0025] Regarding item 36 (scan converter), Ishikawa teaches and suggests (Col. 7, lines 3-14) (with emphasis added):

> **The scan converter 36 performs a conversion to reverse the scan direction of the main scan of the quantized density signal.** More specifically, in a case where the RGB luminance signal that has entered from the input terminal 10 is scanned from left to right, the scan converter 36 effects a change so that scanning is performed from right to left. As a result, the diffusion coefficients in the main-scan direction of the error due to the diffusion processor 28 and the diffusion coefficients in the main-scan direction of the error due to the diffusion processor 20 become symmetrical and an improvement is obtained in phase distortion due to error diffusion.

[0026] Regarding item 20 (diffusion processor), Ishikawa teaches and suggests (Col. 8, lines 23-27) (with emphasis added):

> The output of the adder/subtractor 32 is limited to fall within a predetermined range by the limiter 19 and **the result is diffused to the neighboring pixels by the diffusion processor 20**. The diffused error is accumulated pixel by pixel and outputted to the quantizer 33 and subtractor 35.

[0027] As shown above, Ishikawa does not teach or suggest that "**the anchor value facilitates the reverse diffusion**" as recited in this claim, as amended. Instead, Ishikawa teaches and suggests that calculated error is diffused to the neighboring pixels by the diffusion processor 28; the scan converter 36 performs a conversion to reverse the scan direction of the main scan of the quantized density signal; and that the result is diffused to the neighboring pixels by the diffusion processor 20. Ishikawa does not teach or suggest that these or any other aspects facilitate "reverse diffusion" as recited in this claim, as amended, because as shown above, the diffusion processors are used for diffusing, not

reverse diffusing. The scan converter is used for reversing a scan direction, and is not suggested to perform any reverse diffusion. Furthermore, Ishikawa does not teach or suggest any anchor value that facilitates reverse diffusion. Thus, Ishikawa does not teach or suggest that "**the anchor value facilitates the reverse diffusion**" as recited in this claim, as amended.

[0028] As shown above, the combination of Mancuso and Ishikawa does not teach or suggest at least the claimed features of "an anchor value [that] facilitates reverse diffusion" as recited in this claim, as amended. Consequently, the combination of Mancuso and Ishikawa does not teach or suggest all of the elements and features of this claim. Accordingly, Applicant respectfully requests that the rejection of this claim be withdrawn.

Dependent Claim 29

[0029] Claim 29 ultimately depends from independent claim 23. As discussed above, claim 23 is allowable over the cited documents. Therefore, dependent claim 29 is also allowable over the cited documents of record for at least its dependency on an allowable base claim. Additionally, this claim may also be allowable for the additional features that it recites.

[0030] For example, the Examiner asserts that item 710 of Mancuso, Fig 7 teaches "a reverse diffusion module to apply the reverse diffusion using the anchor value" as recited in this claim, as amended. Applicant respectfully disagrees. In contrast, regarding item 710, Mancuso teaches and suggests the following (Col. 8, lines 47-62):

> The length filter 710 includes two line delays 714a and 714b, two multipliers 716a and 716b, and a minimization block 718. The output of the multiplier 709 is input to the line delay 714a, whose output is further delayed by the line delay 714b. The output of the line delay 714b is input to the multiplier 716b, which weights the delayed signal using a weighting coefficient w, which is stored in a lookup table (not shown). The value of the weighting coefficient w ranges from zero to two. The output of the multiplier 709 also is input to the multiplier 716a, which also weights the delayed signal using the weighting coefficient w. The outputs of the two multipliers 716a and 716b and the line delay 714b are input to the minimization block 718, which computes a final horizontal length H_L by filtering the three length values (i.e., the outputs of the two multipliers 716a and 716b and the line delay 714b).

[0031] As shown in this passage, in further view of the reasons presented above in support of claim 23 from which claim 29 depends, Mancuso does not teach or suggest any "reverse diffusion using the anchor value" as recited in this claim, as amended.

<u>*New Independent Claims 63 and 69*</u>

[0032] Applicant submits that the combination of Mancuso and Ishikawa does not teach or suggest at least the following features of these newly added claims (in part, with emphasis added):

- "wherein an *anchor value facilitates reverse diffusion* by the reversible diffusion function"
- "wherein *the anchor value facilitates the reverse diffusion by the reversible diffusion function to restore the magnitude of the at least some of the pixel values*"

[0033] Without needlessly repeating the reasons presented above in support of claim 23, Applicant submits that these newly added independent claims are allowable for at least the same reasons presented above in support of claim 23.

Dependent Claims

[0034] If not already addressed individually above, in addition to its own merits, each dependent claim is allowable for at least the same reasons that its base claim is allowable. Applicant requests that the Examiner withdraw the rejection of each dependent claim where its base claim is allowable.

Conclusion

[0035] Applicant submits that all pending claims are in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the application. If any issues remain that prevent issuance of this application, the Examiner is urged to contact the undersigned representative for the Applicant before issuing a subsequent action.

Respectfully Submitted,

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